

**Official Amendment**

Serial No. - 10/038,150

Docket No. - UVD 0299 PA / 40815.347

**REMARKS**

Claims 1, 3-53, 123-125 were pending in the present application. Claim 6 has been amended, and new claim 126 was added. As a result of this amendment, claims 1, 3-53, and 123-126 are pending. Reexamination and reconsideration are requested in light of the accompanying amendments and remarks.

Applicants discovered in preparing the Amendment filed May 17, 2005, that the substitute specification filed on February 28, 2002 in response to the Notice to File Corrected Application Papers was not a duplicate of the original specification as filed on January 4, 2002, but an earlier draft version. A corrected specification was filed June 30, 2005.

The provisional rejection of claims 1-53 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 3-48 of copending Application Serial No. 10/038,274 has been overcome. A terminal disclaimer accompanies this response.

The objection to claims 124 and 125 in view of claims 11 and 23 is respectfully traversed. Claims 11 and 32 depend from claim 1 either directly or indirectly. Claim 1 includes limitations which are not present in claims 124 and 125, including, but not limited to, the solubility of the cobalt/valence stabilizer complex. Therefore, claims 11 and 32 and 124 and 125 are not duplicates, and applicants request that this rejection be withdrawn.

Minor amendments have been made to claim 6. Claim 6 was amended to provide proper antecedent basis. These amendments have been made for purposes of clarity and for no other reason.

New claim 126 corresponds to claim 120 as originally filed, with amendments matching those made to claim 1. The addition of this claim is consonant with the restriction requirement of August 26, 2004.

The rejection of claims 1, 3-10, 12-31, 33, 35-43, and 123 under 35 U.S.C. § 102(b) as being anticipated by Schapira (U.S. Patent No. 6,068,709) is respectfully traversed. Schapira

**Official Amendment**

Serial No. - 10/038,150

Docket No. - UVD 0299 PA / 40815.347

teaches a process for the phosphatization of a metallic substrate. The phosphatization bath includes from about 0.3 to about 25 g/l of zinc ion, from about 5 to about 50 g/l phosphate ion, and from about 0.01 to about 10 g/l of a trivalent cobalt complex represented by 1 of 2 formulas. The bath has a pH from about 1 to 5.5. Col. 2, lines 28-62.

In Schapira, the trivalent cobalt complex is an accelerator in the phosphating bath. The purposes of accelerators are to speed up the rate of coating, to oxidize ferrous iron, and to reduce crystal size. The accelerators oxidize the hydrogen from the surface of the metal being coated so that phosphating solution can contact the metal continuously. Accelerators have an oxidizing effect on the dissolved iron in the bath, extending the useful life of the bath. The accelerators remain in the bath.

Phosphate coatings are produced by chemical reaction. The acid bath containing the coating chemicals reacts with the metal to be coated, and at the interface, a thin film of solution is neutralized because of its attack on the metal. In the neutralized solution, the solubility of the metal phosphates is reduced, and they precipitate from the solution as crystals. Crystals are then attracted to the surface of the metal by the normal electrostatic potential within the metal, and they are deposited on the cathodic sites.

Schapira does not teach the claimed corrosion-inhibiting seal. Claim 1 recites that the trivalent or tetravalent cobalt/valence stabilizer complex is present in the solid corrosion-inhibiting seal in order to provide adequate corrosion protection. The trivalent cobalt complex of Schapira is present in the phosphating bath, not the formed coating. Claim 1 also recites that the solid corrosion-inhibiting seal is formed on a coating selected from anodic coatings, phosphating coatings, or black oxide coatings. Schapira's bath produces a phosphating coating, not a seal formed on the phosphating coating. The seals of the present invention could be used over a phosphate coating formed from a bath such as is described in Schapira.

Claim 1 further recites the solubility of the cobalt/valence stabilizer in water. The trivalent cobalt complexes described in Schapira do not have the claimed solubility. The cobalt complexes described in Schapira have high aqueous solubilities. For example, Material Safety

**Official Amendment**

Serial No. - 10/038,150

Docket No. - UVD 0299 PA / 40815.347

Data Sheets for  $[\text{Co}(\text{NO}_2)_6]\text{Na}_3$  (Aldrich Catalog No. 46,373-6) and  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$  (Aldrich Catalog No. 48,152-1) describe both as "very soluble in water." Although a compound that is "very soluble in water" may be an excellent choice as an accelerator for phosphating solutions, it would be a poor choice for a constituent compound in a corrosion-inhibiting seal because it would be washed away quickly by corrosive media.

The high aqueous solubility of the compounds in Schapira is evidenced in the steps required to form the compounds and separate them from solution. For example, processes involving  $[\text{Co}(\text{NO}_2)_6]\text{Na}_3$  are described in Chemical Abstracts Vol. 26, 3200, Chemical Abstracts 1628, and Chemical Abstracts Vol. 45, 4167.  $[\text{Co}(\text{NO}_2)_6]\text{Na}_3$  is used as a water-soluble precipitating agent for potassium. The sodium salt of  $\text{Co}(\text{NO}_2)_6$  exhibits high water solubility, whereas the potassium salt is very insoluble in water. Schapira does not describe the use of the potassium salt because of its low solubility, which would make it unavailable in solution as a phosphating accelerator. The formation of  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$  from aqueous solution requires "salting out" with the addition of 400 ml of concentrated HCl to 1500 ml water with 230 g of  $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$  contained therein. Inorganic Syntheses, Vol. 2, pp. 217-218. Preparation of  $[\text{Co}(\text{NO}_3)(\text{NH}_3)_5](\text{NO}_3)_2$  from the equally high solubility  $[\text{Co}(\text{NH}_3)_5\text{CO}_3]\text{NO}_3$  and nitric acid is detailed in Inorganic Syntheses, Vol. 4, p. 174, 1953. 100 ml of methanol must be added to the 25 ml of water (a standard "salting-out" procedure), followed by heating for 18 hours at 100°C to drive water off in order to produce 10 g of the desired compound. Similarly, the synthesis of  $[\text{Co}(\text{NH}_3)_5\text{CO}_3]\text{NO}_3$  requires extensive evaporation to begin to obtain the product (1.6 l to 500 ml), Inorganic Syntheses, Vol. 6, p. 173-174, demonstrating that even the use of carbonate as a trivalent cobalt valence stabilizer in solution does not ensure that a sparingly soluble trivalent cobalt compound will result. Synthesis of  $[\text{Co}(\text{oxalate})\text{en}_2]\text{Cl}$ , which is analogous to Schapira's  $[\text{Co}(\text{oxalate})\text{en}_2]\text{NO}_3$  also requires extensive evaporation to acquire a product. (Mori, et al. Bull. Chem. Soc. Japan 31:291-5, 1958: CA 52: 18060).

The ability to stabilize trivalent cobalt in a solution as described in Schapira does not guarantee an effective cobalt seal. In the majority of cases, adding stabilizers to the bath is

**Official Amendment**

Serial No. – 10/038,150

Docket No. – UVD 0299 PA / 40815.347

detrimental to the coating formed because of solubility differences. The examples above show that there is a significant difference between stabilization in solution, where maximum solubility is desirable, and stabilization in a formed coating, where sparingly soluble characteristics are desired. High solubility in the water bath is necessary to use trivalent cobalt as an accelerator for phosphating baths. If the solubility of a compound in water is too low, then the compound will be unavailable in the bath to act as an accelerator. Conversely, the present invention involves the presence of a sparingly soluble compound in the formed coating. Nowhere in Schapira are the solubility requirements for the trivalent compounds discussed. The trivalent compounds discussed in Schapira are unusable as coating constituents in the present invention because of their high solubility, which is a necessary requirement to act as an accelerator for the phosphating bath.

The dependent claims further describe the physicochemical characteristics that the oxidized trivalent or tetravalent cobalt exhibits in the seal in order to provide adequate corrosion protection. According to the examiner, the “specific properties recited in the dependent claims, including solubility, the electrostatic barrier, the ion exchange property, and the cavity containing cobalt and an additional ion are inherent properties necessarily present from the presence of the same claimed chemicals, namely the trivalent cobalt complex that has been combined with a ligand (a valence stabilizer).” However, as explained above, the presence of a stabilized cobalt compound in solution as in Schapira is not the same as a cobalt/valence stabilizer complex within the solid corrosion-inhibiting seal, as claimed. Moreover, Schapira’s cobalt compounds do not have the claimed solubility, as discussed. In addition, the dependent claims further describe the physicochemical characteristics that the oxidized trivalent or tetravalent cobalt exhibits in the coating in order to provide adequate corrosion protection, characteristics which are not inherent in Schapira’s cobalt stabilized in solution.

According to the examiner, Applicant’s argument that Schapira does not “teach seals with cobalt formed within the seal itself is not persuasive because, since the compositions of the applied references and the instant claims are substantially identical as are the application

**Official Amendment**

Serial No. - 10/038,150

Docket No. - UVD 0299 PA / 40815.347

methods, then one of ordinary skill in the art would reasonably conclude that the trivalent or tetravalent cobalt complexes of [ ] Schapira [ ] would also be present in the coatings in substantially the same concentrations as that of the instant claims."

However, contrary to the examiner's position, the compositions are not substantially identical, nor are the application methods. Schapira emphasized the difference between its use of trivalent cobalt complexes in phosphating baths and the formation of another type of coating, conversion coatings.

The merit of the Applicants is all the more important as the known uses of the complexes of trivalent cobalt in no case permit the forecasting of the applicability of these products as accelerators in phosphatization baths and processes.

In that connection, it is important to state that until now (see the document EP-A-0 458 020) the only known use of trivalent cobalt complexes was their use in the surface treatments of substrates essentially based on aluminum in view of the formation on these surfaces of conversion coatings instead of the carcinogenic hexavalent chrome derivatives; phosphatization treatments were not contemplated; the thus obtained conversion coatings contain aluminum oxide as a major constituent, at least in volume percentage, and cobalt oxides CoO, Co<sub>3</sub>O<sub>4</sub>, and Co<sub>2</sub>O<sub>3</sub>; due to the use of liquid ammonium in the processes disclosed by EP-A-0 458 020, the conversion reaction takes place at a pH comprised between 5 and 9.5.

Col. 2, line 63 to col. 3, line 13.

Thus, one of skill in the art would recognize the difference between the use of trivalent cobalt complexes in a phosphating bath and their presence in the solid corrosion-inhibiting seals of the present invention, as shown by Schapira. One of ordinary skill in the art would know that the accelerator in the phosphating bath would remain in the bath, and not be deposited in the coating. Such a person would also know that the solubility of the compounds in Schapira exceeds that claimed. The person of skill in the art would also know that Schapira produces a phosphate coating, and that a seal is formed over such a coating.

**Official Amendment**

Serial No. - 10/038,150

Docket No. - UVD 0299 PA / 40815.347

With respect to claim 10, the cobalt compounds of Schapira do not inherently have a central cavity containing a cobalt ion and an additional ion. Nowhere in Schapira is there any type of cobalt compound which has a central cavity containing a cobalt ion and an additional ion. See p. 151, line 20 to p. 152, line 2. The examiner must provide a basis in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art. MPEP 2112. The examiner stated that "the Examiner has provided a rationally [sic] for finding inherency, namely "With respect to specific properties recited in the dependent claims, including solubility, the electrostatic barrier, the ion exchange property, and the cavity containing cobalt and an additional ion are inherent properties necessarily present from the presence of the same claimed chemicals, namely the trivalent cobalt complex that has been combined with the a ligand (a valence stabilizer).""

However, not all valence stabilizers have a central cavity with a cobalt ion and an additional ion. Organic compounds and simple inorganic compounds bond directly to the cobalt ion, whether in solution or in the coating. The valence stabilizers with a central cavity with the cobalt ion and an additional ion are the larger inorganic valence stabilizers that can polymerize, i.e., the heteropolymetallates, such as molybdate, tungstate, vanadate, etc. See p. 21, lines 21-26 and p. 151, line 20 to p. 152, line 2. None of Schapira's compounds have a central cavity having a cobalt ion and another metal ion in it. The central cavity in Schapira's compounds only contains the trivalent cobalt ion. Because not all valence stabilizers form a central cavity with a cobalt ion and an additional ion, that limitation is not inherent.

Furthermore, with respect to claim 3, the claimed solubility is not inherent in Schapira because the solubility of the compounds in Schapira is higher than that claimed, as discussed above. With respect to claim 4, not all cobalt/valence stabilizer complexes form an electrostatic barrier in aqueous solution. See p. 11, lines 13-28, p. 12, lines 23-28 and p. 18, lines 4-28. As to claim 5, not all cobalt/valence stabilizer complexes act as an ion exchange agent towards corrosive ions. See p. 11, line 30 to p. 12, line 6, p. 12, line 29 to p. 13, line 2 and p. 18, lines 21 to p. 19, line 4. None of these limitations is inherent in Schapira.

**Official Amendment**

Serial No. - 10/038,150

Docket No. - UVD 0299 PA / 40815.347

The examiner stated that Schapira teaches the "stabilizers that are claimed as a member of the claimed lists of claims 6, 8, 9, and 12-29, including the solubility adjuster substituent claimed in the lists of claims 30, 31, and 33, including the solubility control agent of claims 35-40, and the additional additives of claims 41-43 (see abstract and col. 2-col. 6 for example)."

Schapira teaches the use of a limited number of ligands: NO<sub>2</sub>, CN, CO<sub>3</sub>, and SO<sub>3</sub>, oxalates, acetates, citrates, gluconates, tartrates, and acetylacetones, and compounds of the formula N(R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>) where R<sub>1</sub>, R<sub>2</sub>, and R<sub>3</sub> are selected independently from one another, in the groups comprising H, the carbonated groups in C<sub>1</sub> to C<sub>6</sub> among which especially alkyl, hydroxyalkyl, hydroxyl, alkylamine, hydroxyalkylamine groups as well as carboxylic or aminocarboxylic acids and their salts.

Claim 6 does not claim a stabilizer at all, but rather the types of coatings which underlie the claimed seal.

Moreover, Schapira does not teach diazenes as in claim 14, thio-, amido-, or imido- derivatives of hypophosphoric, phosphoric, or diphosphoric acids and salts as in claim 15, the substituents of claim 16, oximes as in claim 17, amidine, and imido compounds as in claim 18, dithio ligands as in claim 19, amides as in claim 20, thio-, amido-, or imido- derivatives of phosphonic and diphosphonic acids and salts as in claim 21, amido-, or imido- derivatives of hypophosphoric, phosphoric, or diphosphoric acids and salts containing no sulfur bonding sites as in claim 22, amido-, or imido- derivatives of phosphonic and diphosphonic acids and salts containing no sulfur binding sites as in claim 23, thiourea and thioamide as in claim 24, urea and biuret as in claim 25, monothio ligands as in claim 26, diketone ligands as in claim 27, S-(alkyl- or aryl-thio)thiocarboxylic acids and salts as in claim 28, or phosphine and arsine sulfide or oxide as in claim 29.

Furthermore, Schapira does not teach adjusting the solubility of the cobalt/valence stabilizer complex by the addition of a substituent on an organic stabilizer, as in claim 30, or increasing the solubility using the groups of claim 31. Nor does it teach adjusting the electrostatic barrier layer of the cobalt/valence stabilizer complex by adding a substituent group

**Official Amendment**  
Serial No. - 10/038,150  
Docket No. - UVD 0299 PA / 40815.347

of an organic valence stabilizer as in claim 33. Schapira also does not teach the cationic solubility control agents of claims 37 and 38, or the lubricity agent as in claims 41-43.

Thus, claims 1, 3-10, 12-31, 33, 35-43, and 123 are not anticipated by Schapira.

The rejection of claims 1, 3-10, 12-31, 33, 35-43, and 123 under 35 U.S.C. § 102(b) as being anticipated by the admitted prior art in the disclosure is respectfully traversed. According to the examiner, "[t]he admitted prior art of the instant disclosure, at pages 9 and 10 for example, teaches compositions for seals which meet the requirements of the instant claims, including both a trivalent cobalt compound and a valence stabilizer compound. See particularly, applicant's citation of Japanese patents 77 06,258, 76 42,057, 74 34,929, and 74 14621 for example."

However, the replacement specification which was filed February 28, 2002, and which included the discussion of the Japanese patents cited by the examiner, was not identical to the application as filed. The substitute specification which was filed June 30, 2005, and which is identical to the specification as originally filed, does not include the discussion of the Japanese patents. Because the specification does not contain any discussion of the Japanese references, there is no admitted prior art.

Therefore, claims 1, 3-10, 12-31, 33, 35-43, and 123 are not anticipated by the admitted prior art.

The rejection of claims 44-53 under 35 U.S.C. § 103(a) as being unpatentable over Schapira in view of Ouyang (U.S. Patent No. 5,505,792) is respectfully traversed. Ouyang is cited as teaching coloring and coloring additive for conversion coatings. However, Ouyang does not remedy the deficiencies of Schapira. Therefore, claims 44-53 would not have been obvious to one of ordinary skill in the art at the time the invention was made.

**Official Amendment**  
Serial No. - 10/038,150  
Docket No. - UVD 0299 PA / 40815.347

CONCLUSION

Applicants respectfully submit that, in view of the above amendment and remarks, the application is now in condition for allowance. Applicants respectfully request that claims 1, 3-53, and 123-126 be passed to allowance.

If the Examiner has any questions or comments regarding the present application, he is invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,  
DINSMORE & SHOHL LLP

By Patricia L. Prior  
Patricia L. Prior  
Registration No. 33,758

One Dayton Centre  
One South Main Street, Suite 1300  
Dayton, Ohio 45402-2023  
Telephone: (937) 223-2050  
Facsimile: (937) 223-0724

PLP/amm  
Encls.